Remarks

I. Status of the Application and Claims

At the time that the present Office Action was mailed, the claims pending in the application were claims 61-80. No claims have been cancelled or added herein.

II. The Amendments

Claims 61 and 76 were amended to indicate that the plastics used to form matrices are high transparency plastics. Support for these amendments may be found on page 6 of the application, lines 9-21. Minor amendments were made to claims 64-67, 72-75 and 80 to maintain consistent terminology. Entry of these amendments is respectfully requested.

III. Clarification/Correction of Previous Argument

In discussing the Joachimi in the response filed on April 21, 2011, Applicants argued in part:

> Not only is it unclear that Joachimi discloses metal oxides, it is also unclear that it discloses IR absorbing *particles* of any type. It appears to Applicants that the IR absorbing compounds disclosed by Joachimi in paragraph [0028] may be entirely *dyes* which, unlike metal oxide particles, would be expected to dissolve in the thermoplastic material.

While it is not clear that any of the IR absorbing materials recited in paragraph [28] are metal oxides or particles, later Joachimi discusses pigments that can be included in compositions and indicates that these can be IR absorbing and can be some metal oxides. The specific passages read as follows:

> [0129] Organic as well as inorganic pigments and/or dyes are suitable as IR-absorbing compounds according to the present invention. Carbon black in very small amounts, such as, <0.1 wt. %, preferably <0.01 wt. %, referred to the total composition, may optionally be a constituent of the pigment mixture. The pigments/dyes and/or carbon blacks may optionally also be used in batch form.
>
> [0130] Examples of inorganic pigments include antimony trioxide, antimony pentoxide, basic lead carbonate, basic lead sulfate or lead silicate, lithopone, titanium dioxide (anatase, rutile), zinc oxide, zinc sulfide, metal oxides such as Berlin blue, lead chromate, lead sulfochromates, chromium-antimony titanate, chromium oxides, iron oxides, cobalt blue, cobalt-chromium blue, cobalt-nickel grey, manganese blue, manganese violet, molybdate orange, molybdate red, nickel-antimony titanate, ultramarine blue, as well as metal sulfides such as antimony trisulfide, cadmium sulfide, cadmium sulfoselenides, zirconium silicates, zirconium-vanadium blue and zirconium praseodymium yellow.

[0131] Examples of organic pigments include anthraquinone, azo, azomethine, benzanthrone, quinacridone, quinophthalone, dioxazine, flavanthrone, indanthrone, isoindoline, isoindolinone, methine, perinone, perylene, phthalocyaminine, pyranthrone, pyrrolopyrrole and thioindigo pigments, as well as metal complexes of for example azo, azomethine or methine dyes, or metal salts of azo compounds.

[0132] Suitable polymer-soluble dyes include for example dispersion dyes such as those of the anthraquinone series, for example alkylamino-, amino-, arylamino-, cyclohexylamino-, hydroxy-, hydroxyamino- or phenylmercaptoanthraquinones, as well as metal complexes of azo dyes, preferably 1:2-chromium or cobalt complexes of monoazo dyes, as well as fluorescent dyes, for example those of the benzthiazole, cumarin, oxarin or thiazine series.

[0133] The polymer-soluble dyes may also be used in combinations with fillers and/or pigments, preferably with inorganic pigments such as titanium dioxide.

[0134] According to the present invention, pigments and/or polymer- soluble dyes may be used. The dyes or pigments that are used should be compatible with the thermoplastic polymers used according to the present invention and should not adversely affect their mechanical or other properties.

[0135] Suitable pigment additives include for example fatty acids with at least 12 C atoms such as behenic acid or stearic acid, their amides, salts or esters such as aluminum stearate, magnesium stearate, zinc stearate or magnesium behenate, as well as quaternary ammonium compounds such as tri-(C_1-C_4)-alkylbenzylammonium salts, waxes such as polyethylene wax, resin acids such as abietic acid, colophony soap, hydrogenated or dimerised colophony, C_{12}-C_{18} paraffinic disulfonic acids, or alkylphenols.

[0136] Dyes of the pyrazolone, perinone and anthraquinone type, and furthermore of the methine, azo and cumarin type, are preferred according to the present invention.

[0137] Also preferred are metal-containing pigments such as the inorganic pigments and the metal complexes of azo, azomethine or methine dyes, azomethine, quinacridone, dioxazine, isoindoline, isoindolinone, perylene, phthalocyanine, pyrrolopyrrole and thioindigo coloring agents and bismuth vanadate.

It appears to Applicants that the passages above refer to additives (component D, see paragraph [0115]) and that, while particulate pigments may optionally be added to compositions and may contribute to IR absorption, earlier passages, particularly paragraphs [0026] to [0031], describe the components that are required to be present.[1] Thus, Applicants

[1] Note that, as described in paragraphs [0026]-[0031], component D is in addition to component B, and that the options for component D do not *require* IR absorption.

believe one or more of the IR absorbers in paragraph [0028] must be present in the recited range and, since the presence of other IR absorbers appears to be optional, this must be sufficient to make compositions laser weldable. Applicants have quoted the passages above to make sure that this aspect of Joachimi is apparent and to clarify and/or correct their previous arguments in this regard.

The Rejections

I. Rejection of Claims Under 35 USC § 112, First paragraph

On pages 2-4 of the Office Action, the Examiner rejects claims 61-80 based upon the enablement requirement of patentability. It appears that the primary argument used in this rejection is that the claims are overly broad with respect to plastic matrices (component "a" in claim 61). It is alleged that insufficient information is provided to teach how to make all plastics.

In response, Applicants have amended claims to specify that the plastics used must have a high transparency. Beyond this, Applicants submit that laser welding is not a new and that the use of plastics in laser welding is very well known. The present application lists numerous specific examples of plastic materials that could be used, many of which are recited in dependent claims, and the examples section also provides guidance concerning specific procedures. Thus, Applicants do not see any basis for believing that the selection of appropriate plastic material and the use of this material in laser welding would require undue experimentation by one of skill in the art.

II. Rejection of Claims Under 35 USC § 103

Allegations

On pages 4-5 of the Office Action, the Examiner rejects claims 76-79 under 35 USC §103 as being obvious over Joachimi, *et al.* (US 2003/0130381), in view of Fisher (US 6,620,872). The Examiner alleges that Joachimi discloses a method for producing a laser weldable, transparent material by the high shear mixing of polymer and IR-absorbing compounds in an extruder. It is further alleged that the reference encompasses any IR absorbing compound and that it discloses a range of 0.001 to 0.1 wt%. Although the Examiner concedes that Joachimi does not sufficiently disclose relevant metal-oxide IR

compounds or 1 to 500 nanometer particle sizes, it is alleged that these deficiencies are remedied by Fisher. The Examiner states:

> Therefore it would have been obvious include the ITO or ATO IR-absorbing particles of Fisher in the process for producing the laser weldable transparent material of Joachimi since they are disclosed as being preferred for analogous polymer systems containing IR-absorbing particles and it is prima facie obvious to add a known ingredient to a known composition for its known function. *In re Lindner* 173 USPQ 356; *In re Dial* et al 140 USPQ 244.
>
> The amount of ITO or ATO disclosed by Fisher sits outside of the claimed range, however, Joachimi discloses IR-absorbing materials that fall inside the claimed range, therefore, it is the examiner's position that the amount of IR-absorbing material is result effective variable that further depends on the polymer employed because changing the amount will clearly affect the type of product obtained. See MPEP § 2144.05 (8). Case law holds that "discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art." See *In re Boesch,* 617 F.2d 272,205 USPQ 215 (CCPA 1980). In view of this, it would have been obvious to one of ordinary skill in the art to optimize the amount of IR-absorbing material while maintaining acceptable IR absorption dependent upon the polymer employer including those within the scope of the present claims so as to produce desired end results.
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> As to claims 77-78, Fisher discloses suitable indium-tin and antimony-tin oxide particles useful as IR-absorbing materials in polymer systems (Column 3, line 27). As to claim 79, while Fisher discloses indium-tin oxide, patentee fails to explicitly mention blue indium-tin oxide. Given that there is a small, mutually-exclusive, mutually exhaustive list consisting of the types of indium-tin oxide--yellow (stoichiometric) and blue (non-stoichiometric)--for one with ordinary skill in the art, it would have been obvious to try blue indium-tin oxide.

Later, on pages 6-7 of the Office Action, the Examiner rejects claims 61-75 and 80 as being obvious over Joachimi in view of Fisher and Wissman (US 2004/0030384). It appears that the Joachimi and Fisher references are cited for essentially the reasons provided above and are alleged to make the compositions recited in Applicants' claims obvious. The Examiner suggests that, although these references fail to teach relevant methods of performing laser welding, this methodology is taught by Wissman.

Applicants' *Response*

The components that are present in the compositions taught by Joachimi are set forth in paragraphs [0026] to [0031] of the reference and the IR absorbing compounds that appear to be relied upon to make compositions laser weldable are set forth in paragraph [0028].

These do not appear to include the discrete laser-absorbing particles consisting of nanoscale metal oxides required by Applicants' claims.

The reference that the Examiner relies upon for teaching relevant nanoscale metal oxides, Fisher, appears to be related to, and substantively essentially the same as, WO 02/060988, a reference that was cited in rejecting claims earlier in prosecution. Fisher is concerned with polyvinyl butyral (PVB) polymers that can be used to form a transparent, shatter-proof layer for use in, for example, car windshields. As discussed in the Background section of the reference, this layer tends to transmit heat energy and, as a result, cars or other confined spaces may become uncomfortably hot (see paragraphs [005] and [006]). In response to this problem, the inventors incorporate lanthanum hexaboride into the polymeric layer to absorb infrared radiation and, in preferred embodiments, suggest including a metal oxide, especially indium tin oxide or antimony tin oxide. The reference is not concerned at all with compositions for laser welding or laser marking. As discussed further below, Applicants do not believe that the Examiner has provided a valid explanation as to why one of skill in the art, seeking to modify the laser welding compositions of Joachimi, would look to Fisher and select IR absorbers that were chosen to accomplish a different purpose.

Beyond this, Applicants submit that Fisher never teaches that metal oxides can be effectively used in PVB compositions in the absence of lanthanum hexaboride.[2] In rejecting claims, the Examiner argues that it would have been obvious include the ITO or ATO IR-absorbing particles of Fisher in Joachimi's compositions. In fact, if one of skill in the art were to substitute the IR absorbers taught by Fisher for the "B" compounds of Joachimi, Applicants believe that the resulting composition would include both lanthanum hexaboride and metal oxides. In this regard, it should be noted that Applicants claims require "discrete laser-absorbing particles consisting of nanoscale metal oxides that are sensitive to said laser light and/or nanoscale doped metal oxides that are sensitive to said laser light." Particles of lanthanum hexaboride are not part of the claims. Thus, Applicants believe that the Examiner has read more into Fisher than it actually teaches and that, if its teachings are taken as a

[2] It appears that the IR absorption spectra of compositions having only antimony tin oxide or only indium tin oxide are depicted in Figures 1 and 2 (see paragraphs [0013] and [0014] in Fisher). However, this seems to have been done for the purpose of comparison. Applicants do not believe that the reference ever suggests that antimony tin oxide or indium tin oxide should be used in the absence of lanthanum hexaboride in the polyvinyl butyral compositions that are made for glass laminates.

whole and properly combined with those of Joachimi, the compositions produced would not render Applicants' claims unpatentable.

The reason that the Examiner provides for it being obvious to include the ITO or ATO IR-absorbing particles of Fisher in the process of Joachimi is that: "they are disclosed as being preferred for analogous polymer systems containing IR-absorbing particles and it is prima facie obvious to add a known ingredient to a known composition for its known function." However, as described above, the IR absorbers of Fisher are *not* designed to function in laser welding but rather to be used as part of a layer in glass laminates. It appears to Applicants that criteria used in selecting these agents, *e.g.*, the reflection and transmission of heat energy in glass, would be quite different from the criteria used in Joachimi, such as solubility in thermoplastic material (see paragraph [0104] in Joachimi). In this regard, Applicants believe that the argument that Applicant used in their last response concerning the combination of Joachimi and Kondo also applies to the combination of Joachimi and Fisher. This reads in relevant part:

> Applicants do not believe that it is self evident, as the Examiner seems to suggest, that an IR absorber that has been chosen because of its ability to control the transmission of sunlight in a windshield or building (and for similar characteristics) would be a good choice (or could even be successfully used) to transduce laser energy in a plastic welding composition. For example, in the context of the Kondo reference, particles may be selected to fulfil the objective of hindering the passage of solar infrared radiation. However this would not necessarily mean that infrared radiation is absorbed by the particles; it might be reflected as well. Reflectors of IR radiation, as opposed to absorbers, might have an advantage, for example, in reducing the heating of windshields or the glass of buildings but would not appear to be a good choice for the laser welding objectives of Joachimi. Thus, one of skill in the art attempting to improve the method of Joachimi could not reasonably predict such an improvement would occur using the teachings of Kondo.[3]

Even if one accepts the allegations of the Examiner regarding Wissman, Applicants believe that the considerations above should be sufficient to overcome all rejections that have been made on obviousness grounds.

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[3] This text is taken from page 10 of the Response filed by Applicants on January 30, 2011. A footnote accompanying the text was omitted herein

III. Double Patenting Rejections

In the present Office Action, the Examiner repeats an obviousness-type double patenting rejection of claims based upon claims in US 10/544,041. Although prosecution on these cases has not yet been completed, in an effort to bring the prosecution of the present application to a conclusion as rapidly as possible, Applicants are submitting a terminal disclaimer herewith.

Conclusion

In light of the considerations above, Applicants respectfully request that the Examiner reconsider and withdraw the rejections that have been made. If, in the opinion of the Examiner, a phone call may help to expedite the prosecution of this application, the Examiner is invited to call Applicants' undersigned attorney at (240)683-6165.

Respectfully submitted,
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